

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: H. Adachi et al. : Art Unit:  
Serial No.: To Be Assigned : Examiner:  
Filed: Herewith :  
For: TRANSMITTING CIRCUIT :  
APPARATUS

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents  
Washington, DC 20231

S I R :

Prior to examination, please amend the above-identified application as follows:

TITLE:

Please replace the Title with the following:

TRANSMITTING CIRCUIT APPARATUS AND METHOD

SPECIFICATION:

Please replace the paragraph, beginning at page 1, line 6, with the following:

The present invention relates to a transmitting circuit apparatus and method used in radio communications.

At page 4, lines 20-21:

In addition, the configuration in Figure 15 showing an transmitting circuit apparatus of an optical base station which is another conventional example also requires the linearity of the E/O converter 423, optical fiber 425, and O/E

converter 422 in addition to the large power consumption of the power amplifier 411. Therefore, although the configuration of the slave station is simple, it becomes difficult to obtain linearity as power consumption increases substantially.

At page 5, line 3:

In consideration of the above-described issues, the present invention aims to provide a transmitting circuit apparatus and method having good linearity, high transmission output power efficiency, and small power consumption.

At page 5, line 5:

One aspect of the present invention is a transmitting circuit apparatus comprising:

At page 5, lines 16-17:

Another aspect of the present invention is the transmitting circuit apparatus, wherein the amplitude modulation data has multiple digital values, and

At page 5, lines 23-24:

Still another aspect of the present invention is the transmitting circuit apparatus, wherein the sigma-delta modulator is at least a second-order or higher-order sigma-delta modulator.

At page 6, lines 3-4:

Yet still another aspect of the present invention is the transmitting circuit apparatus, comprising a band pass filter which reduces an unnecessary signal out of a transmitted frequency band of an output signal of the amplitude modulator and outputs the output signal.

At page 6, lines 8-9:

Still yet another aspect of the present invention is the transmitting circuit apparatus, wherein the amplitude modulator has a power amplifier and performs amplitude modulation by controlling a power supply of the power amplifier on the basis of an output signal of the sigma-delta modulator.

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At page 6, lines 14-15:

A further aspect of the present invention is the transmitting circuit apparatus, wherein a class B or class C power amplifier is provided in an output stage of the amplitude modulator.

At page 6, lines 18-19:

A still further aspect of the present invention is the transmitting circuit apparatus, wherein the frequency modulator has a phase-locked oscillator, which includes at least a variable frequency divider, and a second sigma-delta modulator, wherein the second sigma-delta modulator outputs a value, which is obtained by performing second-order or higher-order sigma-delta modulation of data which is obtained by adding the frequency modulation data to carrier frequency data, as a division number of the variable frequency divider, and

At page 7, lines 5-6:

A yet further aspect of the present invention is the transmitting circuit apparatus, wherein the frequency modulator has a phase comparator, a loop filter, a voltage-controlled oscillator, a mixer, and an IF modulator,

At page 8, lines 1-2:

A still yet further aspect of the present invention is the transmitting circuit apparatus, comprising:

At page 9, lines 4-5:

An additional aspect of the present invention is the transmitting circuit apparatus, comprising:

At page 9, lines 22-23:

A still additional aspect of the present invention is the transmitting circuit apparatus, wherein the sigma-delta modulator has:

At page 10, lines 12-13:

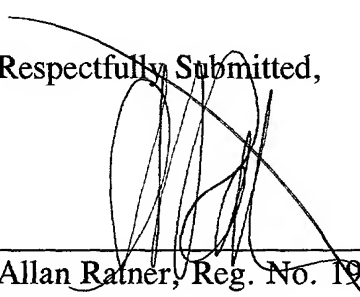
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A yet additional aspect of the present invention is the transmitting circuit apparatus, wherein the sigma-delta modulator has a plurality of low-order sigma-delta modulators that is connected in multiple stages, and

At page 16, line 24:

Next, the operation and method of this embodiment will be described.

Respectfully Submitted,

  
Allan Ratner, Reg. No. 19,717  
Attorney for Applicants

AR/ap

Enclosures:

Version with markings to show changes made

Dated: February 21, 2002

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The Assistant Commissioner for Patents is hereby authorized to charge payment to Deposit Account No. 18-0350 of any fees associated with this communication.

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Kathleen Libby

2002 FEB 21 10 08 AM

VERSION WITH MARKINGS TO SHOW CHANGES MADETITLE:TRANSMITTING CIRCUIT APPARATUS AND METHODSPECIFICATION:

At page 1, line 6:

The present invention relates to a transmitting circuit apparatus and method used in radio communications-etc.

At page 4, lines 20-21:

In addition, the configuration in Figure 15 showing an transmitting circuit apparatus of an optical base station which is another conventional example also requires the linearity of the E/O converter 423, optical fiber 425, and O/E converter 422 in addition to the large power consumption of the power amplifier 411. Therefore, although the configuration of the slave station is simple, it becomes ~~severe to secure the~~ difficult to obtain linearity ~~and~~ as power consumption ~~becomes large~~ increases substantially.

At page 5, line 3:

In consideration of the above-described issues, the present invention aims to provide a transmitting circuit apparatus and method having good linearity, high transmission output power efficiency, and small power consumption.

At page 5, line 5:

~~The 1st invention~~ One aspect of the present invention is a transmitting circuit apparatus comprising:

At page 5, lines 16-17:

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~~The 2nd invention~~ Another aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, wherein the amplitude modulation data has multiple digital values, and

At page 5, lines 23-24:

~~The 3rd invention~~ Still another aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, wherein the sigma-delta modulator is at least a second-order or higher-order sigma-delta modulator.

At page 6, lines 3-4:

~~The 4th invention~~ Yet still another aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, comprising a band pass filter which reduces an unnecessary signal out of a transmitted frequency band of an output signal of the amplitude modulator and outputs the output signal.

At page 6, lines 8-9:

~~The 5th invention~~ Still yet another aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, wherein the amplitude modulator has a power amplifier and performs amplitude modulation by controlling a power supply of the power amplifier on the basis of an output signal of the sigma-delta modulator.

At page 6, lines 14-15:

~~The 6th invention~~ A further aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, wherein a class B or class C power amplifier is provided in an output stage of the amplitude modulator.

At page 6, lines 18-19:

~~The 7th invention~~ A still further aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, wherein the frequency modulator has a phase-locked oscillator, which includes at least a variable frequency divider, and a second sigma-delta modulator, wherein the second sigma-delta modulator outputs a value, which is obtained by performing second-order or higher-order sigma-delta modulation of data which is obtained by adding the

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frequency modulation data to carrier frequency data, as a division number of the variable frequency divider, and

At page 7, lines 5-6:

~~The 8th invention~~ A yet further aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, wherein the frequency modulator has a phase comparator, a loop filter, a voltage-controlled oscillator, a mixer, and an IF modulator,

At page 8, lines 1-2:

~~The 9th invention~~ A still yet further aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, comprising:

At page 9, lines 4-5:

~~The 10th invention~~ An additional aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, comprising:

At page 9, lines 22-23:

~~The 11th invention~~ A still additional aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, wherein the sigma-delta modulator has:

At page 10, lines 12-13:

~~The 12th invention~~ A yet additional aspect of the present invention is the transmitting circuit apparatus ~~according to 1st invention~~, wherein the sigma-delta modulator has a plurality of low-order sigma-delta modulators that is connected in multiple stages, and

At page 16, line 24:

Next, the operation and method of such this embodiment will be described.

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